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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/460,638	12/14/1999	KENNETH G. FLUGAUR	0325.00324	2751

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EXAMINER

ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 06/26/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/460,638

Applicant(s)

FLUGAUR ET AL

Examiner

Rudy Zervigon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 4/17/97
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 December 1999 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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DETAILED ACTION

Continued Prosecution Application

1. The request filed on April 24, 2002 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/460,638 is acceptable and a CPA has been established. An action on the CPA follows.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "wire loop" must be shown or the feature canceled from the claim. No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

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Claim Rejections - 35 USC § 102

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claims 1-14, 16, and 20 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Foster et al (USPat. 5,665,640). Foster et al teach a device (item 58; Figure 2; col. 18 lines 33-59) and method for its fabrication comprising:
 - i. an outer portion (items 271, 270; Figure 2B; col. 18 lines 33-59) comprising an electrically insulative material ("ceramic insulator"; col. 18 lines 42-43), having dimensions effective to prevent or inhibit plasma (col. 18, lines 33-58) arcing (col. 18 lines 50-58) to an electrically conductive surface (item 222; Fig.2B; col. 18 lines 50-58) of a plasma processing chamber (item 40; Figure 2) aperture ("within cylinder 238"; col. 18, line 53), and fit the plasma processing chamber aperture within a predetermined tolerance - as shown by Figure 2B, Foster et al teaches such a tolerance for the aperture (items 271, 270) as being the accommodating dimensions in supporting plates 272, 241, and 239. Further, Foster teaches a flange section (272) configured to remain outside of the plasma processing chamber aperture
 - ii. an inner opening (item 256; Fig.2B; col. 18, lines 33-58), completely surrounded by the electrically insulative material of the outer portion, having dimensions effective to enable transmission of a physical signal ("RF"; col. 18, line 54) or a gas, gas mixture or other material through the device (item 58; Figure 2)

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- iii. 2. A plasma processing chamber having at least one aperture therein, the at least one aperture having an exposed electrically conductive surface, and located inside the aperture
- iv. 3. A method of making a plasma processing chamber, the chamber having at least one aperture therein, the at least one aperture having an exposed electrically conductive surface, the method comprising inserting (screws holding plates 272,239; Fig. 2B) the device of Claim 1 into the aperture
- v. 4. A method of processing a workpiece, comprising the following steps:
 - vi. (A) exposing the workpiece to a plasma in the chamber of Claim 2
 - vii. (B) transmitting a physical signal or a gas, gas mixture or other material through the device into or out from the chamber
- viii. 5. A plasma processing chamber having at least one aperture therein, the at least one aperture having an exposed electrically conductive surface, and
 - ix. a device inside the aperture, the device comprising an electrically insulative material and having:
 - x. (I) dimensions effective to prevent or inhibit plasma arcing to the exposed electrically conductive surface of the aperture ; and
 - xi. (ii) an inner opening completely surrounded by the electrically insulative material, the inner opening having dimensions effective to enable transmission of a physical signal or a gas, gas mixture or other material through the device

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- xii. 6. A method of making a plasma processing chamber, the chamber having at least one aperture therein, the at least one aperture having an exposed electrically conductive surface, the method comprising inserting a device into the aperture, the device comprising an electrically insulative material and having:
 - xiii. dimensions effective to prevent or inhibit plasma arcing to the exposed electrically conductive surface of the aperture, and an inner opening completely surrounded by the electrically insulative material, the inner opening having dimensions effective to enable transmission of a physical signal or a gas, gas mixture or other material through the device
- xiv. 7. The method of Claim 6, further comprising, prior to said inserting, the step of forming said aperture in said chamber
- xv. 8. A method of processing a workpiece (item 228; Fig.2B), comprising:
 - xvi. exposing the workpiece (item 228; Fig.2B) to a plasma in a chamber, the chamber having at least one aperture therein, the at least one aperture having an exposed electrically conductive surface ; and a device in the aperture, the device comprising an electrically insulative material and having
 - xvii. (I) dimensions effective to prevent or inhibit plasma arcing to the exposed electrically conductive surface of the aperture ; and

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- xviii. (ii) an inner opening completely surrounded by the electrically insulative material, the inner opening having dimensions effective to enable transmission of a physical signal or a gas, gas mixture or other material through the device ; and
- xix. (iii) transmitting a physical signal or a gas, gas mixture or other material through the device into or out from the chamber
- xx. 9. A method of operating a plasma processing chamber, wherein the chamber has at least one aperture therein and the aperture has an exposed electrically conductive surface, the method comprising the steps of:
 - xxi. (A) initiating a plasma in the chamber, the aperture having the device of Claim 1 therein, then
 - xxii. (B) cleaning (col.30; line 14) the chamber and the device (items 271, 270; Figure 2B; col. 18 lines 33-59; col. 18; lines 22-24)
- xxiii. 10. The method of Claim 9, wherein said plasma exists in said chamber for a predetermined period of time (col. 3, lines 1-7)
- xxiv. 11. The method of Claim 9, further comprising, prior to said inserting, the steps of:
 - xxv. exposing a workpiece (item 228; Fig.2B) to the plasma, and transmitting a physical signal or a gas, gas mixture or other material through the device into or out from the chamber
- xxvi. 12. A lower section (portion 270/271/256; Figure 2B) contained within 238/232 and an upper portion (portion 270/271/256; Figure 2B) outside of 238/232, the lower section having a first width (diameter) effective to fit the plasma processing chamber aperture

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within a predefined tolerance; and the flange section (272) having a second width that is greater than a corresponding width of the plasma processing chamber aperture

- xxvii. 13. Foster teaches the device as held in the plasma processing chamber aperture by a wire loop configuration (see washers at the 239/232 interface; Figure 2B) to hold the device under plasma processing conditions

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Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Foster et al (USPat. 5,665,640). Foster et al teaches and orthogonal angle between an end of the device (256...Figure 2B) and the bottom of the device.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the angle between an end of the device (256...Figure 2B) and the bottom of the device to be "non-orthogonal".

Motivation for making the angle between an end of the device and the bottom of the device to be "non-orthogonal" is drawn from the level of ordinary skill in the art where an angle other than 90 degrees would readily be considered obvious and would not significantly change the mode of operation of the Foster et al apparatus.

7. Claims 15, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foster et al (USPat. 5,665,640), as applied to claims 1-14, 16, and 20 above, and further in view of Bernard J. Curtis (USPat. 4,328,068). Foster et al does not explicitly teach deriving a physical signal from the device of claim 1 comprising a spectroscopic endpoint detection signal or a channel therefore. Foster et al does not teach the relative distance between a first length and "a length of a channel section".

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Bernard J. Curtis teaches a spectroscopic endpoint detection signal and a channel therefore (34,36,32; Figure 3; column 2, lines 59-68). Additionally, Bernard J. Curtis teaches relative positioning of the "light pipe 32" such that it is not "too close to the substrate" (column 3, lines 20-25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the Bernard J. Curtis spectroscopic endpoint detection signal and a channel therefore as part of the Foster et al apparatus.

Motivation for implementing the Bernard J. Curtis spectroscopic endpoint detection signal and a channel therefore as part of the Foster et al apparatus is drawn to the benefits as discussed by Bernard J. Curtis and directed to "determining the end point of the plasma etching process" (column 1, line 67 - column 2, line 5).

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Response to Arguments

1. Applicant's arguments filed February 19, 2002 have been fully considered but they are not persuasive.
2. Regarding Applicant's contention that "Foster appears silent regarding a device comprising an electrically insulative material having a flange section configured to remain outside of a plasma processing chamber aperture". It remains the Examiner's opinion that Foster does teach a device (item 58; Figure 2; col. 18 lines 33-59) comprising an electrically insulative material ("ceramic insulator"; col. 18 lines 42-43) having a flange (272; Figure 2B) section configured to remain outside of a plasma processing chamber aperture.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311. The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.


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